

## THE TREATMENT OF ECTOPIA VESICAE.<sup>1</sup>

BY F. TRENDELENBURG, M.D.,

Professor of Surgery in the University of Leipzig, Germany.

THE repair of congenital defects of the urethra and bladder constitutes one of the most difficult and for that reason perhaps one of the most interesting chapters in plastic surgery, and if the outcome be successful it may be regarded with intense satisfaction. During the past fifty years many surgeons have occupied themselves with the solution of this problem, and many have been the attempts to devise a method by the aid of which, even in the severe types of the deformity, a restoration of the normal bladder form and normal bladder function could be secured. Up to the present time, however, this ideal has not been reached.

In passing I desire to refer very briefly to some of the essential facts in the history of this subject. In uncomplicated cases of epispadias Dieffenbach effected a cure by freshening the edges of the opening and then uniting them by direct suture. Where the cleft extended into the bladder itself, he regarded operative interference as practically hopeless. Thiersch then introduced a method by which the defect was covered with a neighboring skin-flap and it was he who first succeeded in producing in front of the bladder left everted an enclosed narrow space in which by the aid of a special mechanical contrivance which exerted pressure on the neck of the bladder, the urine could be retained.

For more than twenty years I have endeavored to aid the direct union of the freshened edges in cases of ectopia by producing a separation of the pelvic bones at the sacro-iliac synchondrosis in order to provide for a closer approximation of the two halves of the pelvis anteriorly at the

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<sup>1</sup> Read before the American Surgical Association, May 30, 1906.

symphysis and consequently of the edges of the defect. Only a limited number of surgeons have made use of my method, because the bilateral separation of the os ilci from the sacrum was generally regarded as a very dangerous procedure, and the attempt to produce a bladder in this way which was capable of retaining some urine was not uniformly successful.

Although the latter fact cannot be denied, there is little occasion for fear as regards the separation of the pelvic bones in the manner indicated if the operation is done before the seventh or eighth year. In adults the procedure is undoubtedly much more difficult and dangerous.

In abandoning the attempts to restore a normal bladder cavity, recourse was again had to an idea first proposed by Simon, who suggested that the urine should be diverted into the lower portion of the intestinal canal. In this way there was developed the method now recognized by the name of Maydl, which is characterized by the implantation of the ureters into the sigmoid flexure. The continence which is thus attained may be made to extend over several hours. One of the dangers, however, which is associated with this method is the production of a pyelonephritis, from the entrance sooner or later of some of the intestinal contents into the ureters. Gersuny, Borelius, Mueller, Muscatello and Wehr have all suggested various ingenious modifications for obviating this difficulty, but none have succeeded in entirely overcoming it. And aside from the actual danger to life, the unnatural manner in which the urine must be voided per anum constitutes a great annoyance, particularly to patients of the male sex.

I am quite convinced, therefore, that the advent of Maydl's operation has in no way arrested the further development of plastic surgery in this field, but I believe that very probably ureteral transplantation will again be abandoned and recourse be had to direct suture of the edges of the deformity under discussion as the only means by which the normal relations can be restored. I myself have always



FIG. 1.—Result of operation for ectopia vesicae after the method of Trendelenburg. Power of retaining urine, afterwards lost again.



FIG. 2.—Result of operation for ectopia vesicæ after the method of Trendelenburg.



FIG. 3.—Epispadia with fissure of neck of bladder. Fissure of pelvis.  
Boy retained urine for two hours.



FIG. 4.—Ectopia vesicae. Inguinal hernia. Result of operation.

adhered to this plan, and I now ask your kind permission to describe what I have accomplished along these lines and in what respects I have failed.

As regards my cases of bladder ectopy which were operated upon years ago, I desire to say that there are two patients living whom I have had under observation almost continuously and a third who has been seen occasionally. In all three patients the defect, which extended from the umbilicus down to the glans penis, is completely closed and no fistulous openings are present. The form and shape of the penis itself are moreover quite satisfactory. The bladder when distended consists of a spherical cavity lined with mucous membrane over its greater extent. The passage of small concretions is occasionally observed by these patients but the tendency to calculus formation is by no means as marked as in certain cases operated upon by Thiersch which I have had occasion to examine. These patients partly suffered to such an extent from the production of calculi, incrustations and ulcerations in the irregular crypts of the bladder, that they demanded operation by some other method for the relief of their condition. (Figs. 1, 2, 3, 4.)

Retention of the urine is not complete in any of my three cases. These young men, therefore, wear a contrivance supplied with a small spring which compresses the urethra at the root of the penis either from the front or the back. The patients are now students in college; they are not greatly inconvenienced by the apparatus, and by proper care and attention they avoid the production of any odor which would serve to attract attention to their condition. If the spring is raised with the finger, the urine issues forth in a stream. On lying down it collects in the bladder without leakage. One of the men remains dry throughout the night, he may be awakened once or twice by the desire to urinate and even when he gets up he can voluntarily retain the urine for several minutes and then pass it naturally in a stream.

A fourth patient, a boy of five, could also, when he tried, retain his urine for several hours when standing or walking, but later on, at the time of his leaving the clinic, this ability was lost.

Both of the two cases last mentioned demonstrate that the physiological factors necessary both for retention and voluntary micturition are present, and that they are merely prevented from functioning in a normal manner by certain mechanical conditions. The reason for the failure may be accounted for by the fact that the two sections of the pelvis which have been separated at the sacro-iliac synchondrosis have a tendency to gradually resume their former positions, therefore the neck of the bladder and the prostatic portions of the urethra which are closely connected with the pubic bones, are pulled upon to such an extent that the muscular ring can no longer be brought into play.

I have made several attempts to overcome this difficulty by mobilizing the pubic bones with the help of the chisel or by dissecting widely the attachments of the urethra and the neck of the bladder to the latter. In no instance of complete ectopia have I been favored, however, with a permanent result. Such a procedure, moreover, is apt to lead to the production of a dense scar along the vesical neck, which in the event of a later secondary operation will be found a source of as great annoyance as the cicatrices in a harelip which has failed to heal by primary union.

In cases of epispadias associated with incontinence, as well as in patients who present only a partial ectopy involving merely the vesical neck, the prognosis is more favorable. In these transitional types between simple epispadias and ectopia vesicæ there is also lacking a proper union at the symphysis pubis, but the separation at this point is not so extensive and consequently there is much less lateral tension on the neck of the bladder and the urethra after operative closure.

It is well known that in certain cases of epispadias where the infundibulum is narrow, the previously existing



incontinence may be overcome by direct suture of the urethra after the free edges of the latter have been freshened. But even if the infundibulum is sufficiently large to admit the tip of the little finger and a slight prolapse of the posterior wall of the bladder follows either coughing or straining, there is still some hope that continence may be restored. It is merely necessary in such cases to bring about a narrowing of the muscular ring (around the neck of the bladder) by the excision of a sufficiently wide wedge-shaped section from the upper border of the infundibulum and then carefully closing the resulting gap with buried catgut sutures. If it is found after operation that the urine still fails to be fully retained, then it becomes necessary to repeat the procedure, a larger strip being taken than on the former occasion.

In cases marked by a broad infundibulum and a partial ectopy of the bladder it is advantageous to make use of the space between the pubic bones at the symphysis to gain approach to the vesical neck and the prostatic portion of the urethra, which may be thus more readily freed. A vertical incision is made through the skin over the region of the symphysis and carried down between the pubes to the anterior wall of the bladder and the infundibulum. By means of two strong sharp retractors the pubic bones may then be forced apart and through the space thus gained and with the patient in the elevated pelvic position, the trimming of the edges of the ectopic bladder and subsequent suture is greatly facilitated. Enough tissue should be removed to leave broad bleeding surfaces which may then be approximated with catgut sutures. In the region of the neck of the bladder the edges are turned in and brought together with a suture similar to that employed by Lembert for the intestine. The caliber of the new urethra is controlled by a small catheter previously inserted, but this should be removed at the close of the operation, otherwise it will exert a dangerous degree of pressure on the suture line. In place of it there may be substituted

a small drainage tube, which is inserted through a special opening made in the anterior wall of the bladder. The suture of the skin wound then completes the operation.

I obtained in this manner a perfect result with only a single operation in a boy of 12, to whom some of the photographs herewith presented refer (Figs. 5, 6, 7, 8). An X-ray disclosed the cleft in the pelvis, the pictures of the genitals show clearly the broad infundibulum; one picture was taken during the operation and another depicts the urinary stream during voluntary micturition.

A few years ago I also had an opportunity of operating upon a female patient for epispadias. In women, as is well known, this condition is much more infrequent than in men. Guetschow was able to find only thirty-five instances of this deformity reported in the literature. Strange to say there is no reference made in any of these cases to a cleft in the pelvis, although we must expect to find it, inasmuch as the condition is analogous to that in the male, and as in the severe cases a cleft of the bony structure is certainly always present. In the absence of an X-ray examination this feature may however escape notice. In a little girl of five, operated upon by myself, the separation at the symphysis amounted to three centimeters, and the picture of the external genitals was the usual one associated with epispadias of a marked degree. The labia majora and minora were separated above, and at the anterior end of each labium minus was situated a half of the divided clitoris. Above the hymen one could look directly into the infundibulum, the inferior wall of which was lined with the mucous membrane of the widely-gaping urethra. Through this infundibulum it was readily possible to introduce the little finger into the bladder. On straining, a small section of the posterior wall of the bladder came into view; years ago, according to the statement made by the child's parents, the greater portion of the bladder prolapsed through the opening. We had to deal, therefore, with an extreme degree of epispadias, but with only a partial ectopia of the bladder.



FIG. 5.—Epispadias with fissure of neck of bladder. Fissure of pelvis.



FIG. 6.—Epispadia with fissure of neck of bladder. Fissure of pelvis.



FIG. 7.—Ectopia vesicis. Result of operation.



FIG. 8.—Epispadia with fissure of neck of bladder. Fissure of pelvis.  
Functional result of operation. Boy retains urine for two hours.

As there was a well-marked diastasis at the symphysis, and as a good union of both bladder and urethra was to be expected only if the lateral tension could be eliminated, the first step in the operation consisted of the bloody separation of the pelvic bones at the right sacro-iliac synchondrosis. It was found that this was sufficient to permit of the complete approximation of the two halves of the pelvis anteriorly. The freshening of the edges and the suturing of the cleft in the neck of the bladder was carried out just as in the previous case, and then the symphysis was wired. After healing took place, the incontinence continued because the urethra and the neck of the bladder were still too wide. The entire operation was therefore repeated a year later, the wire suture being first removed, the two halves of the pelvis forced apart, the urethra and the neck of the bladder incised and narrowed and the silver-wire suture finally replaced at the symphysis. The result of this procedure was continence during the day extending over several hours, and complete retention during the entire night. The wire suture was the cause of the production of a fistulous tract, but the latter closed when the suture which had already cut its way through the bone was extracted. And now after a period of six years the result is still perfectly satisfactory.

The question naturally arises, why was not a similar effect obtained in cases of complete vesical ectopia? The explanation may be found in the fact that it is impossible in these cases to bring together the pelvic bones in front and to keep them permanently in position. Wiring of the bones particularly in boys cannot be advantageously employed, because the wire comes in conflict with both the bladder and the penis. In younger children, moreover, the wire is very apt to cut its way through the tissues.

I am of the opinion that it would be wise to go back to the old idea advanced by Demme and Passavant and to make an attempt to bring about the desired changes in the bony structures of the pelvis by orthopedic measures. The rapidly-growing osseous tissues of the young do not offer

much resistance to even slight degrees of pressure provided it is constantly applied. The bone yields and gradually undergoes marked alterations in form and contour. Thus we find in cases of congenital macroglossia with prolapse of the markedly hypertrophied tongue, that the constant pressure of this soft tumor on the anterior portion of the inferior maxilla is such that in the course of years the middle section of the lower jaw assumes an oblique position and the alveolar process with the incisor teeth is turned entirely forward and downward. Ordinary soft mucous nasal polypi, if large or numerous, are liable in young individuals to displace the bony framework of the nose and thus to produce marked facial deformity. And the effect of constant though comparatively slight pressure intentionally applied to infantile bones is well illustrated by the feet of the Chinese women. The mother begins according to the statement of Perthes the treatment of her daughter's foot in her fourth to fifth year, applying a bandage twice daily in such a manner that the foot is held in a position of plantar flexion. The bandage causes so little pain that the child does not even cry and yet the treatment is so effectual that the growth of the foot is arrested to such a degree that complete fixation of this part in a position of abnormal plantar flexion results during the course of a few years.

There seems to be no good reason why with the exercise of time and patience the infantile pelvis may not be similarly molded in cases of vesical ectopia. Thus the mother may be directed to apply a snug and sufficiently wide rubber band around the child's pelvis and hips for some definite period during the day and night. If this be supplemented by operative division of the pelvic bones at the synchondrosis it may be possible to bring together permanently in this manner the two halves of the pelvis and to convert the transversely placed oval defect of the abdominal wall into a narrow vertical slit. This would produce practically the same conditions which are present in epispadias associated with a partial ectopia of the bladder and we should then



expect to have the same satisfactory operative result as in the less severe types of the deformity.

Cases of vesical ectopia are quite rare and their treatment demands the exercise of much time and patience. It is only by the united labors of many investigators that substantial progress can be attained.

Perhaps my brief communication may be the means of stimulating further research in this country on the lines indicated, which I have come to regard as the only method which is likely to be rewarded by perfect results.